Parenting Profiles in Military Families: Intervention-Related Transitions and Relationships to Child Adjustment

A DISSERTATION
SUBMITTED TO THE FACULTY OF THE UNIVERSITY OF MINNESOTA
BY

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IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Dr. Timothy Piehler

August 2021

Acknowledgements

It would not have been possible to complete this dissertation and go through the long Ph.D. journey without the continued support, trust, and guidance of many. First, I would like to express sincere gratitude to my advisor, Dr. Tim Piehler. My success would not have been possible without his endless patience, encouragement, and guidance. I always felt lucky to have Tim as my advisor for his thoughtful mentorship and his respect and care for students. I would also like to express special thanks to my Dr. Abi Gewirtz, who inspired me with her enthusiasm in research and sharing ADAPT data and research with great lab members. I am also very grateful to my dissertation committee. Dr. Lindsey Weiler had been a great role model throughout my program, and I am thankful for the opportunity to work together on your projects. Dr. Darin Erikson was my savior with the constructive and clear statistical feedback for my dissertation.

I would also like to thank the following faculty members for their instructions and guidance throughout my graduate career: Dr. Joyce Serido, Dr. Jodi Dworkin, Dr. Zha Blong Xiong, Dr. Susan Walker, Dr. Beth Magistad, and Dr. Meredith Gunlicks-Stoessel. I also thank Dr. Cathy Solheim for her heart for international students.

I would not have made through without my amazing peers and colleagues I met throughout my program (this will be a long list!). Their presence and encouragement have filled my past years with joy and were my source of strength especially during the global pandemic.

Finally, I would like to shout-out to my family members who inspired me towards my path in family science. Their endless trust and unconditional support kept me going and built self-confidence. I cannot imagine my doctoral program without them.

Thank you God for your grace and mercy.

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Sun-Kyung Lee

August 2021

Abstract

Parenting programs aim to improve parenting quality such as reducing harsh parenting which may, in turn, support the child's development and behavior. However, parenting interventions show considerable heterogeneity in response patterns across different families, demonstrating that they are not one-size-fits-all programs. However, there is a lack of understanding in who benefits from parenting interventions and how to increase the benefit and the program efficiency. Existing studies have focused on single moderators to understand the variability in intervention-related change rather than looking more broadly at profiles of multiple variables. Following this literature gap, this study sought to identify heterogeneity in parenting profiles and treatment responses to advance the effectiveness of family-based prevention interventions adapted for combat-deployed military families. This dissertation relied upon data from a randomized controlled trial of the ADAPT parenting-focused preventive intervention for military families. The sample included 336 (294 fathers, 314 mothers, and 336 children) National Guard and Reserve families. Families were eligible for participation in the study if they had at least one child living with them (4-13-year-old), at least one parent who had been deployed to recent conflicts in Iraq and/or Afghanistan.

Study 1 demonstrated heterogeneity in parenting strategies for both mothers and fathers separately within the sample. Latent profile analyses (LPA) were conducted with five core parenting domains from an observed family interaction task. The analyses demonstrated that mothers and fathers both have three unobserved parenting profiles, which were consistent with high, middle, and low positive parenting. Study 2

investigated the change in parenting profiles of parents in military families after participating in the ADAPT intervention. This study extended Study 1 by applying latent transition analysis (LTA), a longitudinal person-centered analysis, to examine how broader profiles of parenting behaviors were related to change or stability in those profiles, and the relationship of parenting profile transitions with child maladjustment. The findings suggested that the ADAPT parenting intervention is beneficial in improving the parenting skills of mothers who begin the program with more typical levels of parenting skills, and that these positive changes in parenting may help to decrease child externalizing problems. ADAPT seemed to be most helpful in preventing declines in positive parenting for fathers who began the program with typical levels of positive parenting. It may be that fathers will benefit from additional support or practice and time to ensure they also make significant improvements in their parenting practices through parent programming.

One of the key contributions of this research overall is demonstrating the sample heterogeneity in parenting behavior and the variability in parent responses to the evidence-based parenting program. Moreover, both studies yield additional insight into differences between mothers and fathers and provide further support for the value of exploring unique parenting-related findings for mothers and fathers separately. In conclusion, the ADAPT program seems to be successful for certain subgroups in improving parenting and preventing regressions in parenting, and in turn improving child adjustment. As researchers continue to learn more about who benefits most from what content in parenting programs, this approach will help developers to create

adaptive programming targeted to the needs of particular families and enhance the effects of the program for parents and families in need.

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Of the 2 million of American service members deployed since September 11, 2001, almost half are parents with most being fathers (Defense Manpower Data Center, 2015). These service members face substantial challenges with combat exposure and a high risk of combat-related posttraumatic stress disorder (PTSD; Polusny et al., 2011; Hendrix, Jurich, & Schumm, 1995). Combat-related PTSD can occur after experiencing or witnessing a traumatic event such as seeing severely wounded comrades, witnessing death, and dead civilians in war zones, and is associated with flashbacks, severe anxiety, numbing, avoidance of reminders, and hyperarousal symptoms (American Psychiatric Association, 2013; Pizarro, Silver, & Prause, 2006). Even though PTSD often co-occurs with other mental health problems (e.g., depression, suicidal ideation, substance use), the prevalence rates of PTSD are shown to be higher than that of depression among National Guard service members (Rytwinski et al., 2013; Thomas et al., 2010). It is well documented that poor parental mental health is associated with parenting challenges (Borre & Kliewer, 2014; Belsky and Barends 2002), but for military parents, PTSD is a critical risk factor that disrupts parenting (Glenn et al., 2002; Riggs, Byrne, Weathers, & Litz, 1998).

In previous literature, military parents' PTSD was negatively related to parenting satisfaction (Samper et al., 2004), increased parenting stress (Blow et al., 2013; Khaylis et al., 2011), and impaired parenting skills (Glenn et al., 2002). Gewirtz and colleagues (2010) found an association between PTSD and inept discipline parenting practices when measured in military parents during the conflicts in Iraq and

Afghanistan. In addition, a review of parents with PTSD symptoms in general, including combat trauma, showed the relationship of PTSD with decreased maternal sensitivity, emotional availability, and poor parent-child relationships (van Ee, Kleber, & Jongmans, 2016).

Military deployment impacts not only the deployed parents but also partners and children. In 2010, service members had been deployed an average of 1.7 times, and the average length of deployment was 7.7 months (Denning, Meisnere, & Warner, 2014). The unexpected, prolonged, and repeated absence of the service member, accompanied anxiety of injuries and death, and the reintegration stress are shared family stressors which, in turn, increase the risk of emotional and behavioral problems among military children (Gewirtz, DeGarmo, & Zamir, 2018a; Alfano et al., 2016; Warner et al., 2009). For example, parental absence during deployment was associated with increased child internalizing (e.g., anxiety, depression) and externalizing (e.g., conduct problems, aggression) symptoms (Gorman et al., 2010; Rosen, Teitelbaum, & Westhuis, 1993; Jensen, Grogan, Xenakis, & Bain, 1989). During active conflicts from 2003 to 2008, psychological health visits for military children rose dramatically (Denning et al., 2014).

Theoretical Framework

The risks following parent deployment on children seem to occur primarily through parent-child relationships and parents' parenting practices (Palmer, 2008). This phenomenon is represented in social interaction learning theory (SIL; Patterson, Chamberlain, & Reid, 1982). SIL is a developmental framework that states how parenting practices mediate the impact of adverse family contexts or family stressors

(e.g., combat deployment-related stress) on children's maladjustment. Current parenting literature empirically supports the framework by showing the significant associations between coercive parenting (e.g., negative reinforcement, high rate of aversive behaviors) with child maladjustments such as internalizing and externalizing symptoms, deviant peer association, school failure, and substance use (Dishion & Patterson, 2006; Patterson, 2005; Rothbaum & Weisz, 1994).

In addition, the Family Stress Model (Conger, Patterson, & Ge, 1995) supports the SIL framework to understand how PTSD can affect the family process. The family stress model understands the family processes with a focus on external stressors such as divorce, poverty, and mental health problems that affect family functioning, primarily through impacting parents and parenting behaviors which subsequently impact child development. For military families, Gewirtz, DeGarmo, and Zamir (2018a) showed that parental deployment-related stressors were the most significant predictor of child functioning during deployment, suggesting that reducing stress and supporting parenting can support children's adjustment both during and following deployment. Palmer (2008) called for additional support for military families during times of increased stress to enhance the family process through parenting classes and support groups for parents. Yet, only a few parenting programs have targeted and demonstrated effectiveness for military families (Gewirtz et al., 2011).

After Deployment: Adaptive Parenting Tools (ADAPT)

After Deployment, Adaptive Parenting Tools (ADAPT) is the first evidence-based parenting intervention designed primarily for military families with school-aged

children (age 4-12). The program was adapted from an empirically validated parenting program known as the Parent Management Training: Oregon Model (PMTO), which is based on SIL theory. PMTO contains five core parenting components that aim to improve parenting and reduce coercive interactions: (1) skill encouragement, (2) effective problem-solving, (3) warmth and positive involvement, (4) monitoring, and (5) providing effective discipline (Forgatch & Patterson, 2010; Patterson, 2005). PMTO studies have empirically demonstrated improvement in parenting and child adjustment for those who participated in the program across a range of populations including divorced, single, or low-income parents, maltreated children, and universal populations (Forgatch & Patterson, 2010; Patterson, 2005; Reid, Patterson, & Snyder, 2002). In a 9-year follow-up study of stepfamilies, the benefit of the program expanded from improved parenting and child outcomes to reducing family substance use, financial stress, and police arrests (Forgatch, Patterson, DeGarmo, & Beldavs, 2009; Forgatch & DeGarmo, 2007).

The ADAPT intervention extends PMTO with a specific focus on military families by including content relevant to the deployment context and additional components focused on emotion regulation and emotion coaching skills. Evaluations of ADAPT have shown the effectiveness of the parenting program in improving parenting practices and child outcomes. For example, Gewirtz, DeGarmo, and Zamir (2016), using an intent-to-treat approach, found that ADAPT was associated with improved parenting efficacy for both mothers and fathers at 6-month follow-up. Gewirtz and colleagues (2018b) demonstrated that the ADAPT program had positive effects on

observed parenting practices at 12-month follow-up and that positive parenting improvements were associated with improvements in child adjustment.

Effectiveness of Parenting Programs

Parenting programs generally aim to improve parenting quality in a variety of domains, such as reducing harsh disciplinary strategies and increasing praise and support, which may, in turn, support the child's development and behavior. A large body of research supports the importance of parent-child interactions, and it is generally accepted that parent training approaches can be effective in addressing a variety of areas of children's adjustment, including child behavior problems as well as other areas such as cognitive development and anxiety (Kaminski et al., 2008; Cicchetti et al., 2000; Barrett et al., 1996).

However, in the parenting intervention literature, little consideration has been given to which parenting dimensions (e.g., limit setting, praise) are most responsive to intervention programming. It is also not clear how parents presenting with different profiles of parenting skills may differentially respond to programming. Following this literature gap, it is critical to better understand how unique parenting profiles may relate to unique patterns of response to the intervention. Notably, previous research demonstrated that about one-third of families showed no treatment effect in response to a parent-focused intervention (van Aar et al., 2019). Answers to these questions will help inform the development of adaptive intervention programming by identifying the unique needs and likely responses to parenting programming in heterogeneous groups of parents. Studies on who benefits from parenting interventions will guide the selection

of target groups, increase program efficiency, and sustain implementation processes; in the long term, parenting literature can refine parenting theories that anticipate positive child adjustment (Leijten et al., 2019).

The Current Studies

This dissertation utilized secondary data from ADAPT, a randomized controlled trial of a parenting intervention program designed for military families, that was conducted in Minnesota (Gewirtz et al., 2014). The goal of this research was to investigate how heterogeneity in parenting related to improvements in fathers' and mothers' parenting skills in response to a parenting intervention. This dissertation is divided into two studies: The first study identified the distinct profiles of parenting skills found in both mothers and fathers in military families; The second study then explored how parents' pre-intervention parenting profiles may impact their subsequent parenting profiles following the intervention.

Study 1: Profiles of Mother and Father Parenting Practices in a Parenting Intervention for Military Families

Introduction

Since 2001, more than two million service members have been deployed overseas to the recent conflicts in the Middle East (Defense Manpower Data Center, 2015). More than half of those service members are married and approximately two million children have grown up in military families (Office of the Deputy Under Secretary of Defense, 2011). After military parents serve their duties during wartime, many military families demonstrate their resilience and adjust well to their post-deployment routines (Park, 2011). However, deployment is a unique family stressor that can impact the family system. Increasing evidence shows that deployment to war is associated with risks to child and partner adjustment (Kelley & Jouriles, 2011). For the service members, there is an increased risk of PTSD, depression, and substance misuse due to combat exposure or during the transition into civilian life (Asnaani et al., 2014; Jacobson et al., 2008). Due to deployment, the family members of servicemen and servicewomen also face multiple challenges, such as disrupted family routines, mental health problems, reintegration after extended separations, and impaired parenting practices (Paley et al., 2013; Mansfield et al. 2010). Those children with military parents with severe mental health problems were negatively affected (i.e., increased anxiety and adjustment problems) through maladaptive parenting skills (Giff et al., 2019; Gewirtz et al., 2018a; Lester et al., 2016). When a family experiences a military

deployment, both the deployed and non-deployed parent is at higher risk for parenting challenges (Gewirtz et al., 2018a; Creech, Hadley, & Borsari, 2014).

Parenting characteristics.

In general, parenting practices and the parent-child relationship are well-established protective factors to prevent a negative impact on child adjustment following family stress (Luthar et al., 2015; Masten, 2014; Kumpfer & Alvarado, 2003).Parenting practices involve a multidimensional set of behaviors that parents engage in to influence and support the emotional, social, and cognitive development of their children (Baumrind, 1996). Parenting behaviors can be influenced by individual, societal, and situational factors (Belsky & Jaffee, 2015; Morris, Silk, Steinberg, Myers, & Robinson, 2007; Abidin, 1992).

In the social interaction learning (SIL) model, five effective parenting practices are specified that lead to positive child adjustment (Forgatch & DeGarmo, 2002). First, problem-solving involves developing possible strategies to achieve set goals, facilitating resolution to the problem, and supporting relevant adjustments after trying out different approaches. Second, positive involvement involves the multiple ways that parents provide support for and demonstrate their interest in their children's activities. Third, skill encouragement involves parents' use of positive reinforcement and scaffolding such as breaking goals into achievable steps and encouraging steps towards the goal by reinforcing desired behaviors. Fourth, monitoring, also known as supervision, involves parents tracking their children in their whereabouts, peers, activities, and the adults in

charge. Lastly, discipline involves teaching appropriate rules with mild sanctions for violating rules such as time out and privilege removal. These five parenting domains are the core components in the Parent Management Training Oregon (PMTO) model, a parent training program designed to reduce coercive parent-child interactions and enhance parents in their use of positive parenting strategies (Gewirtz et al., 2018b; Martinez & Forgatch, 2001).

Parenting research is often criticized for conducting its research primarily with mothers, despite evidence of the impact of fathering on children's adjustment (Jaffee et al., 2003; Tamis-LeMonda & Cabrera, 2002; Cabrera et al., 2000). Recently, the role of parent gender has gained attention in theoretical and empirical research with a number of differences emerging (Kawabata et al., 2011; Schaeffer et al., 2005; Crick and Zahn-Waxler 2003). Some research found mothers were more likely to use harsh discipline than fathers (Straus and Stewart, 1999). However, fathers' inept discipline has been found to be a much stronger predictor of children's problem behavior relative to mothers' use of the inept discipline (Hoeve et al., 2012; Patterson & Dishion, 1988). In general, our understanding of how parenting processes may differ between mothers and fathers is limited, in part due to the overreliance on mothers in parenting research (Campana et al., 2008). In order to advance our understanding of parenting, it will be important to consider parent gender when examining parenting (McKee et al., 2007).

Military Parents and their Parenting.

Under the family stress model, marital status (i.e., divorce, single parenting) and deployment-related stressors (i.e., posttraumatic stress symptoms, deployment status) are stressful family contexts that can impact parenting practices and, in turn, child adjustment (Conger et al. 2002; Gewirtz et al., 2018a; Davis et al., 2015). Previous literature on deployed military families' parenting has exclusively focused on PTSD and its association with their parenting (Creech et al., 2014). PTSD symptoms were related to poorer parenting practices (Gewirtz et al., 2010), a decrease in parenting communication and cooperation between the parental figures (Allen et al., 2010), and higher parenting stress (Creech et al., 2014). Also, with long separations due to deployments, it can be difficult for returning parents to know the current developmental stage of the child (i.e., monitoring) and how to build an effective relationship (i.e., positive involvement and skill encouragement) with their children (Creech et al., 2019). Deployment transitions were also related to higher maltreatment rates, primarily by the civilian parents (Creech et al., 2014). Trautmann and colleagues (2015) identified the parenting concerns of military fathers after deployment: feeling emotionally disconnected, having positive communication, and practicing effective discipline with their children. Moreover, the proportion of single parents is higher in the military than civilian population (Clever & Segal, 2013). Yet, there is limited research investigating parenting within single-parent military families, but existing research has noted that these families face a number of unique challenges, including economic strain, limited social support, and family instability, that may impact their parenting approach (Skomorovsky et al., 2016).

Heterogeneity in Parenting.

Previous research makes clear that there is significant heterogeneity in family experiences and functioning (Connell et al., 2008; Halpern-Meekin & Tach, 2008). To increase our understanding of the variability in parenting characteristics in these families, a person-centered approach is an appropriate method to examine the relationship of multiple indicator variables within families simultaneously (Masyn, 2013). This approach assumes the existence of unobservable subgroups within the population. The contrasting yet most commonly used method is a variable-centered approach, which examines the relationship of variables within the population (e.g., family or individual factors as moderators of parenting) (Gardner et al., 2010). The variable-centered approach assumes homogeneity within a sample and a linear relationship between independent and dependent variables.

However, parenting is a combination of multiple behaviors that are likely to be a part of a larger profile of an overall parenting approach. A number of studies have demonstrated the interactive effects of different parenting behaviors (Lansford et al., 2014; Deater-Deckard et al., 2006). For example, parental warmth may moderate the effects of discipline practices (Germán et al., 2013; Xiao et al., 2018). When we examine individual parenting behaviors for their relationships with child adjustment, these interactive effects are not considered. Looking at profiles will help us better understand how certain parenting behaviors may tend to co-occur within a given population and how these profiles may relate to other aspects of family and child adjustment.

Therefore, applying a person-centered approach to explore the heterogeneous subgroups within a sample of military families is a methodologically innovative way to understand these subgroups. Furthermore, we know little about how risk variables such as mental health and family structure may relate to membership in heterogeneous parenting profiles. This approach could also lay the foundation for future research to further examine how the heterogeneity of parenting practices in the military family context may relate to response to parenting-focused interventions.

The Current Study

Despite the interactive nature of parenting behaviors, we know little about how parenting behaviors are likely to co-occur in broader profiles, particularly in post-deployed military families with elevated mental health risks. Parenting profiles of parents who are from post-deployed military families will provide a foundation to better understand the heterogeneity in parenting within high-risk families. Furthermore, we know little about how parenting profiles may differ between mothers and fathers, as well as how variables such as marital status and PTSD symptoms may relate to different types of parenting profiles.

The purpose of Study 1 is to explore the heterogeneity in parenting profiles of both mothers and fathers in military families. Specifically, the research questions are as follows:

1. Are there meaningful subgroups of mothers and fathers within military families using indicators of observed parenting behaviors?

2. Do parent's individual factors such as PTSD and marital status relate to their identified subgroups?

Latent profile analysis, a person-centered analysis, was utilized to answer those research questions, and to identify the subgroup of mothers' and fathers' parenting, independently. Moreover, this study addresses an important parenting literature gap by using observed parenting measures. Most studies have utilized parent-reported measures of parenting that can be biased due to social desirability effects (van Aar et al., 2019). Many studies are also limited by examining single parenting subcomponents rather than using more holistic measures of parenting comprising a number of subcomponents (Leijten et al., 2019). Therefore, the understanding of these unique profiles of observed parenting will be helpful in understanding common patterns of parenting strength and limitation and ultimately examining how these profiles may relate to variability in the response of parent training programs.

Methods

Participants

This study drew data from the first randomized controlled trial of the ADAPT intervention (Gewirtz et al., 2018b), including a sample of 336 military families (294 fathers and 314 mothers) from a Midwestern state. Families were eligible to participate

if they had at least one child aged 4–13 years and at least one parent who had been deployed to recent conflicts in Iraq and/or Afghanistan. Of the 336 families in the current study, most had a deployed father and a nondeployed mother (87.41%). Twenty-two families (8.15%) had two deployed parents while 12 families (4.44%) had a nondeployed father and a deployed mother. About 89% of fathers and 89% of mothers were married.

The average length of marriage with current partners was 9.6 years (*SD*=5.3). The fathers were, on average, 37.47 years old (*SD*=6.43; range 23–58), predominately Caucasian (89.62%); a small percentage were African American (5.00%), Asian American (2.31%), Pacific Islander (0.38%), and multiracial (2.69%). The mothers were on average 35.72 years old (*SD*=5.84; range 23–51), predominately Caucasian (95.06%), with a small percentage identifying as African American (1.90%), Asian American (1.14%), Pacific Islander (0.38%), Native American (0.38%), and multiracial (1.14%). Most families were middle class (41.5% of families reported annual household income between $40,000 and $79,999 and 30.7% between $80,000 and $119,999). About half of the parents (46.4% fathers and 52.6% mothers) completed at least a bachelor's degree. Focus children (55.5% girls) were on average 8.41 years old (SD=2.52) at baseline. These sample characteristics are representative of the NG/R parent population with school-age children in the Midwest.

Procedure

Participants were recruited through multiple means such as presentations at military-sponsored events (e.g., pre-deployment and reintegration training), outreach at

military organizations, media (social media, television, radio advertisements), mailing from the local Veterans Affairs Medical Center, flyers, and word-of-mouth by military parents and stakeholders. Interested parents completed an online screener and consented to participate in the study if they were eligible. After completing an online survey and in-home assessment at baseline (preintervention), families were randomly assigned into either an intervention (60%) or control group (40%). Control families received services as usual, including “tip sheets" and online resources. Intervention families participated in a 14-session parenting intervention, consisting of weekly face-to-face group sessions located in a nearby school, church, or community center and online intervention resources (optimally within a 30-45-minute drive from home). All families completed baseline (T1) and three follow-up assessments: 6-month (T2), 1-year (T3), and 2-year (T4). The current study relied upon only data collected from the baseline assessment point. The ADAPT intervention is reviewed in more detail in Study 2.

To support parents, dinner and childcare are offered during each session, and a $15 gift card was provided for travel costs. The project provided parents with a $25 incentive for online assessment completion (up to two parents per family), and each family received a $50 incentive for in-home assessment completion. Children received small gifts, approximately $1-5 in value, for completing the in-home assessment. All procedures were approved by the Institutional Review Board at the University of Minnesota (IRB number: 1005S82692).

Measures

Observed parenting: Family Interaction Tasks (FITs). Parenting practices were directly observed from parent-child interactions during structured FITs. This study used only the baseline measures. Total FITs assessment times ranged between 40-60 minutes and included a series of 5-minute tasks where parent-child (mother-child, father-child, mother-father-child) (i) problem solving, (ii) deployment-related concerns, (iii) plan a fun family activity, (iv) teaching games (i.e., puzzle completion task in which parents assist children when felt necessary), and (v) monitoring.

Five parenting practices have been previously investigated by the social interaction learning (SIL) model: (1) problem-solving, (2) skill encouragement, (3) monitoring, (4) positive involvement, and (5) inept discipline. Blinded trained coders scored the FITs using the Coder Impressions System (Forgatch, Knutson, & Mayne, 1992) evaluating each of these parenting practices. Prior studies demonstrate good construct validity (Forgatch & DeGarmo, 1999) and high inter-coder correlations (ICCs ranging from .78-.88). All items were rated on a 5-point Likert scale ranging from 1 (untrue/never) to 5 (very true/always). For both mothers and fathers separately, items were averaged to create composite scores for each of the following five indicators:

1. *Problem solving*. Assessed with a 9-item scale evaluating the quality of parent-child solution, apparent satisfaction with discussion outcome, and the likelihood the family would put this solution to use (α = .87–.89; inter-rater ICC = .88–.94).
2. *Skill encouragement.* Based on the teaching task, the parent's skill encouragement was scored with an 8-item scale reflecting the parent's

encouragement and scaffolding strategies to promote children's skill development (α = .76–.83; inter-rater ICC = .72–.76).

3. *Monitoring.* Measured with a 4-item scale assessing parent's supervision and knowledge of child's daily activities (α = .60–.71; inter-rater ICC = .74–.64).
4. *Positive involvement.* Scored with a 10-item scale evaluating parent's warmth, empathy, and affection (α = .75–.76; inter-rater ICC = .76–.84).
5. *Inept discipline.* Assessed with an 8-item scale reflecting overly strict, inconsistent, authoritarian parenting practices (α = .75; inter-rater ICC = .58–.78).

Class Predictors. Parents reported their marital status at the baseline whether they are *Never Married, Married, Divorced, Separated,* or *Widowed*. This was recoded as 1 (*Married*) and 0 (*Not married*; including the rest of options other than *Married*). Parental PTSD was assessed by using the Posttraumatic Stress Disorder Checklist (PCL; Weathers, Litz, Herman, Huska, & Keane, 1993). The PCL is a 17-item self-report questionnaire that measures the presence of PTSD symptoms in the last month following the Diagnostic and Statistical Manual of Mental Disorders (4th ed. DSM-IV; American Psychiatric Association, 1994). The military version includes questions about trauma experienced while serving in the military (e.g., Feeling upset when something reminded you of a stressful military experience). The civilian version asks about other experiences of trauma (e.g., repeated, disturbing memories, thoughts, or images of a stressful experience from the past). Response options range from 0=Not at all to

4=Extremely, with higher scores indicating greater PTSD symptoms. The sum score of all the items was used for the study analysis.

Analysis

Analytic Plan. First, preliminary analysis of study variables was conducted by including the calculation of descriptive statistics (i.e., means, standard deviations, skewness, and kurtosis) to assess variable characteristics and evaluate analytic assumptions. Bivariate correlations were computed to examine the overall measurement validity and associations among key study variables. Descriptive statistics were examined using SPSS version 25.

Then, a *latent profile analysis (LPA)* was utilized by using the baseline levels of five observed parenting practices for both mothers and fathers with the M*plus* 8.0 program. LPA is a person-centered analysis that identifies unobservable categorical subgroups within a population based on multiple observed responses. The people within these subgroups are expected to be homogeneous based on their relationship with observed variables. This analysis captures the multidimensional latent subgroups that cannot be represented by a composite quantitative variable (Masyn, 2013). The manual 3-step approach was used to find the latent profiles of parenting practices for both mothers and fathers separately at baseline (T1) and examine predictors of class membership. The manual 3-step approach, developed by Vermunt (2010), is a process to prefix model classification uncertainty to minimize the shifts in latent class formation when including covariates due to their association with the class indicators.

In step 1, the latent class measurement models for both parents were explored separately. Because the number of latent classes is unknown, the step identifies the number of classes that best describe the heterogeneity within the data. Each LPA model included 5 indicators of parenting practices: five core observed parenting practices of mothers or fathers. To find the best fitting number of classes, the study compared the obtained fit information as a part of the class enumeration process. The fit information includes absolute and relative information and the interpretability of each model.

The absolute model fit is indicated by the likelihood ratio. The likelihood ratio shows a good fit when it has the fewest number of classes while not rejecting the null hypothesis ($p>.05$). The relative model fit includes Akaike information criterion (AIC; Akaike, 1987), Bayesian information criterion (BIC; Schwarz, 1978), adjusted BIC (aBIC; Sclove, 1987), adjusted Lo-Mendell-Rubin likelihood ratio test (adjusted LMR-LRT; Lo, Mendell, & Rubin, 2001). The LMR-LRT compares the k-1 class with the k class model. Optimal models are indicated by lower values of the AIC, BIC, and aBIC a significant difference with the previous model in the LMR-LRT shows the k class model is better than a model with one less class. To evaluate the interpretability, entropy was considered for classification diagnostics. Entropy ranges from 0 to 1, where closer to 1 shows a better classification of cases, and .70 is seen as a cut-off reflecting reasonable classification (Fonseca & Cardoso, 2007). Also, the proportion of the sample within each class and profile interpretability was considered in order to obtain quantitatively and qualitatively meaningful profiles during class enumeration.

In step 2, after determining the best number of classes, the classification of class uncertainty and latent class probabilities for most likely latent class membership were

computed from the estimated LPA model. The automatically computed logits for class probability were used to prefix uncertainty rates of class membership. Then in step 3, when the uncertainty measurement errors are specified, predictors were included. Because both the mother and father samples include single parents and married couples, marital status was examined as a predictor of class membership. Given the relatively high prevalence of PTSD within post-deployed families, parents' PTSD was also included as a predictor of class membership.

Missing data. The percentage of missing data on fathers' variables ranged from 2.4% to 8.3%. The primary measures included in the Little's missing completely at random (MCAR) test were consistent with a pattern of missing values among father study variables that were missing completely at random, $\chi 2$ (17) = 21.515, p >.05. The percentage of missing data on mothers' variables ranged from 1.0% to 7.5%. Little's MCAR test, however, showed that the pattern of missing values was not missing completely at random among mother study variables, $\chi 2$ (19) = 37.562, p < .01. The missingness was significantly correlated with the positive involvement parenting variable and was likely missing at random (MAR). This predictor variable of missingness was included in the LPA as an indicator. The study utilized full information maximum likelihood (FIML) to address missing data. FIML estimation selects the parameter estimates using all available data and is preferred over other methods for dealing with missing data (Johnson & Young, 2011).

Results

Descriptive analysis, means, standard deviation, and correlations for fathers' and mother's study variables are shown in Table 1. Overall, fathers and mothers showed similar average scores on their parenting practices. Fathers' marital status was unrelated to any of the parenting practices.

Fathers' marital status was negatively associated with their PTSD symptoms (r = .17, p < .01) but not related to any of the five core parenting practices. Fathers' problem solving skills were positively correlated with positive involvement (r = .47, p < .001) and encouragement (r = .23, p < .001). Fathers' positive involvement was positively correlated with encouragement (r = .62, p < .001) and monitoring (r = .39, p < .001); monitoring was positively correlated with encouragement (r = .38, p < .001). Fathers' inept discipline was negatively correlated with problem solving (r = -.26, p < .001), positive involvement (r = -.29, p < .001), and encouragement (r = -.15, p < .001). Mothers' marital status was related to their problem solving (r = .18, p < .001), positive involvement (r = .21, p < .001), and inept discipline (r = -.24, p < .001). In contrast to fathers, mothers' PTSD symptoms were not related to their marital status but to monitoring (r = -.19, p < .01) and inept discipline (r = .14, p < .05). For mothers, most of the parenting practices were intercorrelated with each other except problem solving and monitoring (r = .09, p > .10). Problem solving showed the highest association with positive involvement (r = .54, p < .001) and lowest with encouragement (r = .20, p < .001).

Normality for all key variables was tested using kurtosis and skewness indicators. Acceptable levels of skewness fall between – 3 and + 3 and kurtosis between -10 to +10 (Brown, 2006). Observed parenting practices for mothers and fathers did not exceed the acceptable values of skewness or kurtosis (*Fathers*: skewness -0.395 – 1.736, kurtosis -0.639 – 3.629; *Mothers*: skewness -0.388 – 2.121, kurtosis -0.563 – 6.417).

Fathers' parenting profile. The results from the first step of the LPA exploring the best fitting unconditional latent profile models for fathers are shown in Table 2. These indices suggested that the 3-class model was the optimal solution considering both fit and parsimony. Specifically, the 3-class model had significant values of LMR-LRT and was the elbow of the decrease point in the AIC and BIC values. Also, the profiles were interpretable with an adequate proportion of the sample in each class (minimum about 10%), and the entropy value of .758 was above the suggested cut-off.

The 3-class profile of fathers at baseline is depicted in Figure 1. The first profile ("High Parenting," n = 133, 48.4%) represented strong parenting skills with high scores in each of the four optimal parenting practices and low scores in the inept discipline. A second profile ("Middle Parenting," n =113, 41.1%) represented a middling parenting profile, showing similar patterns with the high group but relatively lower scores in positive parenting, especially in encouragement and monitoring. Lastly, the third profile ("Low Parenting," n = 29, 10.5%) showed the lowest parenting practice scores in problem-solving and positive involvement and the highest scores in inept discipline.

Next, marital status and PTSD symptoms were added as class predictors by using the 3-step approach. Setting the "Low Parenting" father group as a reference group, there were no significant differences in marital status and PTSD symptoms

among the three father parenting groups. However, married fathers were marginally more likely (though not obtaining significance) to be in the "High Parenting" group (OR = 6.05, p = .051) or "Middle Parenting" group (OR = 3.99, p = .078) relative to the "Low Parenting" group.

Mothers' parenting profile. A similar procedure was followed to create mother profiles. Table 2 displays the first step of the LPA exploration in determining the best fitting unconditional latent profile models for mothers. Similar to the fathers' parenting profiles, the indices suggested that the 3-class model was the most plausible solution. None of the models had significant values of LMR-LRT, and other fit indices were fairly equivocal. However, the 3-class model was the elbow of the decrease point in the aBIC values and had meaningful profile interpretability with adequate representation of the sample in each class (i.e., smallest group proportion above 10%) (refer Table 3). The entropy value of .744 was above the suggested cut-off.

The 3-class profile of mothers at baseline is depicted in Figure 2. The first profile ("High Parenting," n = 100, 33.8%) represented strong parenting skills with high scores in each of the four optimal parenting practices and low scores in the inept discipline. A second profile ("Middle Parenting," n =166, 56.1%) represented a middling parenting profile showing a similar pattern as the high group but relatively lower scores in problem-solving. Lastly, the third profile ("Low Parenting," n = 30, 10.1%) showed the lowest scores in positive involvement and monitoring, and the highest scores in the inept discipline.

Again, a 3-step approach was used to examine the marital status and PTSD symptoms as predictors of those identified classes. Setting the "Low Parenting" mother group as a reference group, there were no significant differences in PTSD symptoms among the three mother parenting groups. However, there was a trend that those with higher PTSD symptoms were less likely to be in the "High Parenting" group relative to the "Low Parenting" group (OR = 0.95, p = .078). For marital status, married mothers were significantly more likely to be involved in the "High Parenting" group (OR = 5.21, p = .024) than the "Low Parenting" group.

Discussion

The overall goal of Study 1 was to explore the meaningful heterogeneity of parenting profiles in military families. It is important to identify the heterogeneity of parenting behaviors to better understand families who have experienced high-risk stressors such as deployment, including groups with elevated risks and groups with strengths. In this analysis, three meaningful subgroups of mothers and fathers were identified in latent profile analysis. When compared, mothers and fathers shared similar parenting profiles patterns in terms of observed five core parenting skills in parent-child interaction tasks (problem-solving, positive involvement, skill encouragement, monitoring, and inept discipline). Interestingly, PTSD was not a significant individual predictor for both mother and father groups. When examining marital status, married mothers were more likely than single mothers to be members of profiles reflecting high levels of positive parenting skills.

For both mothers and fathers, the latent class analysis identified three meaningful profiles of their parenting practices: high, middle, and low positive parenting skills. The high positive parenting group represented the highest positive parenting, while the low positive parenting group showed the lowest positive parenting across indicators. The key characteristic of low positive parenting groups for both mothers and fathers was high levels of inept discipline in the interaction tasks. Within each subgroup for both mothers and fathers, parents consistently showed relatively higher parenting skills in positive involvement and monitoring relative to problem-solving and skill encouragement.

Comparing mothers' and fathers' parenting profiles, fathers' high parenting group had relatively lower problem-solving skills than mothers in the high parenting group. About 95% of fathers were deployed service members; fathers' lower problem-solving skills (developing positive goal setting with possible solutions) could be related to a higher level of distress avoidance (ignoring aversive behavior or affective distress of the child) (Brockman et al., 2016). For fathers, the primary distinction between the middle parenting group and the low parenting group was their level of inept discipline. The low parenting group demonstrated notably higher levels of inept discipline. Mothers showed more distinct groups compared to the fathers' profile groups. For mothers, there was not much distinction in monitoring and inept discipline between high and middle parenting groups. However, the middle parenting group in mothers showed a much higher level of monitoring. Across all mother profiles, mothers appeared to receive higher monitoring scores than fathers. Mothers could have shown more monitoring behaviors because they were more likely than fathers to be the civilian

parent who was the primary caregiver of their child during their partner's deployment. The observational measure may not have accurately captured the monitoring behaviors of fathers. The interaction task focusing on monitoring had both partners present. In this co-parenting context, mothers were often more proactive in demonstrating their monitoring practices relative to fathers. If fathers were given the opportunity to independently demonstrate their monitoring, this may have more accurately captured their skills in this area.

Contrary to the expected relationship between PTSD and parenting, there was not a significant relationship between PTSD and membership in parenting profiles for both mothers and fathers. Previous literature found PTSD to be a strong predictor of parenting practices in military families and related to parent functioning in parent-child interaction patterns (Gewirtz et al., 2018a; Snyder et al., 2016). It may be that PTSD is a predictor of parenting practices as a whole but not a key predictor to identify distinct profiles representing relatively homogeneous subgroups of military parents.

The current study supported that single mothers are more likely to show lower levels of positive parenting practices when compared to married mothers. Divorce is a well-known risk factor for family adjustment (Amato & Keith, 1991). The relationship between marital status and mothers' parenting may be a result of single parents having more limited support networks when compared to married couples (Kelly et al., 1994). Single parents often experience increased physical and emotional parenting challenges as the sole primary caregiver of the child (Targosz et al., 2003). Unfortunately, less is known about the relationship between marital status and parenting behaviors in high-

risk families, specifically with military families and fathers. Improvements in parenting may also improve couple adjustment and parent's overall well-being (Bullard et al., 2010; Patterson et al., 2010). Given this complexity, future parenting studies should investigate in more depth the association between marital status and parenting practices in high-risk families.

Limitations

Several limitations of the study should be noted. First, the pattern of missing values was not completely at random for mothers' data. The analysis was conducted using the FIML approach which minimizes bias when missing values are at random. However, the possibility of bias in mothers' results should not be ignored. Second, there is the possibility of bias in results due to the small sample size. Since LPA is an exploratory analysis to find unobserved groups within a sample, it is recommended to have a large sample size in order to have enough power to detect distinct subgroups. While a sample of 300 military family parents represents a relatively large sample of this unique population, it is possible a three-class model is not the best representation of the heterogeneity within the population. Third, as LPA is a data-driven analysis, the results should be replicated with another group of post-deployed military families to confirm the heterogeneity within the group. Because of the specificity of the sample, findings may not be generalized to other groups of parents such as non-military families. Finally, parenting indicators were extracted only from the observed parent-child interaction tasks, but alternative parenting indicators could be used. For example, future studies may consider incorporating well-established self-report parenting measures in addition

to observational measures. Adding several parenting indicators from multi-informant, multi-method data could reduce the effects of any bias present in the observed measures.

Conclusion

To our knowledge, this study is one of the first to explore the heterogeneity of parenting in post-deployed military families for mothers and fathers separately. Mothers and fathers are often grouped together, and this may obscure important distinctions in parenting characteristics between gender roles. Indeed, differences between mothers' and fathers' parenting profiles emerged in this study; only mothers' parenting profiles showed a significant association between marital status and high levels of positive parenting.

Furthermore, a low positive parenting profile involved elevated inept discipline as a key indicator for both mothers and fathers. Given the association between inept discipline and negative child adjustment (Mackenback et al., 2014), it will be important to better understand how profiles characterized by this parenting style may predict response to a parent training program.

Study 2: A Latent Transitional Analysis (LTA): Intervention Effects on Mother's and Father's Parenting Profile Transitions and Relationships with Child Distal Outcomes

Introduction

Beginning in the late 1960s, there was a shift in addressing children's behavior problems from an individual level to family-level interventions. This shift was due to the recognition that parents are influential agents to change children's behavior and that the family context is the proximal social environment where children learn behaviors that contribute to their adjustment (Gewirtz, Forgatch, & Wieling, 2008; Wickrama & Kaspar, 2007; Belsky, 1984; Bandura, 1969). Presently, a large body of research supports the importance of parent-child interactions for child adjustment, and it is generally accepted that parent training approaches can be effective in addressing areas beyond child behavior problems such as cognitive development and anxiety (Kaminski et al., 2008; Cicchetti et al., 2000; Barrett et al., 1996).

Parenting programs aim to improve parenting quality such as reducing harsh parenting which may, in turn, support the child's development and behavior. Interventions targeting parenting are complex as parenting consists of values, knowledge, and skills and is practiced by unique individuals. Surprisingly, in the parenting intervention literature, little consideration has been given to which parenting dimensions (e.g., limit setting, praise) are most responsive to intervention programming. We also know little about how parents presenting with different profiles of parenting skills may differentially respond to programming. Therefore, the current study focuses

on identifying who benefits from parenting interventions. If successful, this program of research will guide the selection of target groups, increase program efficiency and effectiveness.

Need for Effective Parent Training Programs

Family processes influence children's psychological, physical, and social well-being. Family functioning is associated with family mental health (Patterson, 1982), and poor parenting or negative relationships with parents may increase the risk of child behavioral and emotional problems (Cummings & Davies, 1994; Sanders et al., 2003). Parenting programs are preventive interventions designed to improve parenting skills and child emotional and behavioral outcomes (Epstein, Fonnesbeck, Potter, Rizzone, & McPheeters, 2015).

Many studies have demonstrated the efficacy of parenting interventions to improve parenting skills and child adjustment (Barlow & Stewart-Brown, 2000). For example, two meta-analyses demonstrated the effectiveness of the Triple P Positive Parenting Program (Sanders et al., 2000), a multilevel program designed to improve parenting. These meta-analyses demonstrated the sustained benefits of the program on parenting and child adjustment among families of diverse backgrounds (Thomas & Zimmer-Gembeck, 2007; de Graaf et al., 2008). Both reviews noted the existence of variability in Triple P effectiveness, however, with some families benefiting and others not. The Incredible Years, another well-established, evidence-based, family-focused intervention (Webster-Stratton, 2006), also has strong evidence that it improves parenting behavior and reduces child behavior problems in families from diverse

backgrounds (Kim et al., 2008; Gross et al., 2003; Scott et al., 2010; Hutchings et al., 2007). Research investigating the program has similarly noted differences in effectiveness for different families, based on a number of different children and family characteristics (Menting et al., 2013).

Improving effective parenting via evidence-based parenting programs is highly recommended to promote positive child adjustment in at-risk families (Forgatch & Patterson, 2010). Specifically, providing such support to the National Guard and reservist families is especially important due to the limited access to support and resources in these military communities (Mmari et al., 2009). National Guard soldiers who recently returned from deployment also showed a greater preference for family-based interventions over individual treatments to address post-deployment mental health and stress in child-rearing practices (Khaylis et al., 2011). Without effective interventions for military families, their traumatic stress may increase the risk of divorce, child maladjustment, and negatively impact the well-being of service members. Despite this need, there is a lack of empirically supported interventions addressing parenting in military families suffering from combat-related traumatic stress (Gewirtz et al., 2014). After Deployment, Adaptive Parenting Tools (ADAPT) is the first evidence-based parenting intervention developed specifically for military families. It has been demonstrated to improve parenting and school-age child outcomes (Gewirtz et al., 2018b). Recent studies found that intervention effects on parenting practices can vary by parents' characteristics such as PTSD symptoms and emotional avoidance (Chesmore, Piehler, & Gewirtz, 2018; Zhang, Zhang, Gewirtz, & Piehler, 2018).

Heterogeneity in Parent Training Program Responses

A major aim of the field of prevention science is to better understand which families are likely to benefit the most from preventive intervention programming (Fairchild & Mackinnon, 2014). Even when receiving the same parenting program, some parents are likely to benefit while others are not (van Aar et al., 2019). Parenting programs may produce heterogeneous effects due to various factors: intrapersonal (e.g., demographics), interpersonal (e.g., couple discrepancies), community (e.g., access to external support), and cultural (e.g., values) factors. It remains not fully clear who is most or least likely to benefit from parenting programs despite a large number of parenting trials (Forgatch & Patterson, 2010; Thomas & Zimmer-Gembeck, 2007). Common statistical approaches to investigating trial outcomes also obscure heterogeneity. Most studies assume homogeneity of families within a sample when examining outcomes (Pelham et al., 2017) and model only linear relationships between family characteristics and outcomes when examining variability in intervention effects (Leijten et al., 2013).

Despite variability in parent response, current parenting programs tend to be delivered in a one-size-fits-all approach, meaning all parents receive the same parent training. Notably, previous research demonstrated that about one-third of families showed a limited or nonresponse to a parent-focused intervention (van Aar et al., 2019). Much of the research investigating variability in response has focused on single variable moderators. However, to the best of our knowledge, there is no existing research investigating how broader parenting profiles encompassing a variety of parenting skills may change in response to a parenting program and how pre-intervention profiles may

predict variable intervention response. Following this literature gap, it is critical to better understand how unique parenting profiles may relate to unique patterns of response to the intervention. If researchers can understand the unique characteristics of those who benefit or do not benefit from specific approaches, programming may be tailored to best meet individual needs and produce stronger effects (Turney, 2015).

Use of Latent Transition Analysis to Understand Variability in Intervention Response

Existing approaches to examining intervention outcomes present limitations in understanding intervention response. Measuring latent constructs and examining their changes over time were commonly performed by analyses that look at quantitative changes using continuous variables, such as structural equation modeling, growth modeling, and multilevel modeling (Muthén, 2002; Sorgente et al., 2019). For example, many longitudinal intervention studies have used latent growth models (LGM) to demonstrate the variability of effectiveness in the intervention (Dishion et al., 2008; Shaw et al., 2007; Zhang et al., 2020). LGM accounts for individual and group differences in growth trajectories (Muthén, 1992; Curran et al., 1998; Duncan & Duncan., 2004; DeGarmo, 2004). For example, using the repeated measures of participants, slope variation in individual trajectories can be estimated; the group means and variation in growth for treatment conditions can be estimated from the individual trajectories. However, this method does not distinguish within-group differences, meaning the within-parent differences in profiles of parenting practices. Furthermore,

LGM generally relies upon single continuous outcome variables, not allowing this approach to model more complex constellations of parenting practices (Collins, 2006).

The use of a longitudinal person-centered approach such as latent transition analysis (LTA) allows for the identification of unobserved within-sample subgroups and changes in those subgroups over time. LTA is a longitudinal extension of the latent class mixture model which is used to model changes over time in membership in categorical variables. In other words, it is a well-suited method to explore changes in group membership (i.e., unobserved latent nominal classification) over time while accounting for the measurement error and the uncertainty of group membership (Graham et al., 1991; Nylund, 2007). This method can also include predictors and distal outcomes to extend the understanding of the transitional process (McGrath & Tschan, 2004; Nylund, 2007).

Therefore, incorporating an intervention effect and distal outcome in LTA can answer whether the intervention effect varies across classes over time, and how distal outcomes are predicted by different transitions. These findings could help to address some of the limitations of previous approaches to evaluating variability in intervention outcomes. For example, Connell and colleagues (2008) investigated the effectiveness of the Family Check-Up intervention, a brief, family-focused, motivationally-based preventive intervention, using LTA. The LTA revealed that youth in a comorbid group experiencing high internalizing and externalizing symptoms were more likely to transition into a normative group (i.e., low likelihood of problems) when receiving the intervention. There are several studies that have incorporated LTA to evaluate how

interventions may differentially impact different subgroups (Roberts & Ward, 2011; Mackesy-Amiti et al., 2013). Notably, those studies did not include outcomes to see how those qualitative nominal changes within groups may be related to key distal outcomes. In prevention studies, there is a need to extend LTA by examining the relationship between the transitions with the distal outcome. For example in family-based interventions, adding a distal outcome will provide information on how those changes of parents may be related to improving child developmental outcomes. Even though LTA has been present in the social sciences for many years (Collins & Wugalter, 1992), this approach has been used infrequently in prevention science and family-focused studies to evaluate intervention effects or to understand behavior change.

The Current Study

Parenting interventions show considerable heterogeneity in response patterns across different families, demonstrating that they are not one-size-fits-all programs. However, there is a lack of understanding in who benefits from parenting interventions and how to increase the benefit and the program efficiency. Existing studies have focused on single moderators to understand the variability in intervention-related change rather than looking more broadly at profiles of multiple variables. Applying a longitudinal person-centered analysis such as LTA provides additional understanding of this variability beyond the advantages of traditional LGM studies by examining how broader profiles of parenting behaviors may be related to change or stability in those

profiles. Therefore, the purpose of Study 2 is to investigate the change in parenting profiles of parents in military families after participating in the ADAPT. Specific research questions are as follows:

1. Do mothers and fathers of military families significantly change their parenting profile group after participating in the evidence-based parent training program?

    a. If yes, which parent profile group benefits from the parent training program?

The study hypothesized that the individuals who were in the control group were more likely to remain in the same class at the 12-months follow-up, while those who were in the ADAPT program were more likely to move towards adaptive parenting profiles.

2. Are changes in parenting profiles associated with distal child externalizing and internalizing behavior outcomes?

The study hypothesized that transitions toward more adaptive parenting profiles would be associated with improved child adjustment.

To answer the research questions, latent transitional analysis, an extended longitudinal analysis of a person-centered approach, was utilized. This analysis examines the changes of unobserved subgroups over time. While Study 1 used latent profile analysis to identify the heterogeneous parenting profiles of both mothers and fathers in military

families, Study 2 evaluated whether membership in these profiles of parenting skills changed after the intervention and predicted improved child mental and behavioral problems at 2-year post-baseline. This research has strong implications for parenting-based intervention studies by identifying parenting profiles(s) that are likely or unlikely to change through evidence-based programs and, in turn, how these transitions may influence child adjustment.

Methods

Participants

Study 2 used the same data set as described in Study 1. The sample included 336 (294 fathers, 314 mothers, and 336 children) National Guard and Reserve families. Families were eligible for participation in the study if they had at least one child living with them (4-13-year-old), at least one parent who had been deployed to recent conflicts in Iraq and/or Afghanistan, and were willing to participate in a parenting program. For detailed demographics of the sample, see Study 1.

Procedure

The data collection procedure is identical to Study 1. The families were randomly assigned to the intervention or control group in a 6:4 ratio; the intervention group was involved in 14 group parent training sessions while the control group received service as usual. The data were collected at baseline (T1) and three follow-up assessments: 6-month (T2), 1-year (T3), and 2-year (T4). The current study used all data points except

for T2 while Study 1 only used the baseline assessment. Follow-up parent profiles were derived from T3 data, and child outcomes were examined using T4 data.

ADAPT Intervention

After Deployment, Adaptive Parenting Tools (ADAPT) is the first evidence-based parenting intervention designed primarily for military families with school-aged children (age 4-12). The program was adapted from an empirically validated parenting program known as the Parent Management Training: Oregon Model (PMTO), which is based on SIL theory. PMTO contains five core parenting components that are to replace coercive interactions: (1) skill encouragement, (2) effective problem-solving, (3) warmth and positive involvement, (4) monitoring, and (5) providing effective discipline (Forgatch & Patterson, 2010; Patterson, 2005).

The ADAPT program is a 14-week 2-hour face-to-face group-based preventive intervention program to improve the five core parenting practices targeted in PMTO and an additional emotion socialization component (Gewirtz et al., 2014). Each group consists of a group of 6-15 parents with 2-3 certified trained facilitators. In the sessions, parents learn parenting skills through observation, role-play, and discussions, and provide access to a website that has supplemental resources (e.g., tip sheets, home practice assignments). Reintegrating military families who were randomized to the ADAPT program showed positive changes in parenting practices (Gewirtz, DeGarmo, & Zamir, 2018b).

Measures

Observed parenting: Family Interaction Tasks (FITs). Study 2 used the same observational parenting measures as Study 1, consisting of five parenting indicators: problem-solving, skill encouragement, monitoring, positive involvement, and harsh discipline. This observational family interaction data was collected during in-home assessments at T1, T3, and T4 and coded by the trained coders based on the Coders' Impression tool (Forgatch, Knutson, & Mayne, 1992). For analysis, T1 and T3 FITs data were used.

Child adjustment outcomes: BASC-2 PRS. Child internalizing and externalizing behaviors are measured using both parents' reports on the Behavioral Assessment Scale for Children – Parent Rating Scale (BASC-2 PRS; Reynolds & Kamphaus, 2004). The BASC-2 is a widely used measure of child emotional and behavioral functioning with high internal consistency and test-retest reliability (Reynolds & Kamphaus, 2004). Internalizing symptoms include depression (e.g., "cries easily"), anxiety (e.g., "worries"), and somatization (e.g., "Complains of pain") subscales. Externalizing behavior includes hyperactivity (e.g., "acts out of control"), aggression (e.g., bullies others), and conduct problems (e.g., "breaks the rules") subscales. All items are rated on a 4-point scale asking the frequency of the child's behavior (0=never to 3=almost always). The BASC-2 uses different versions based on child age that T-scores are calculated for each subscale based on national norms. The average of both mother and father reports on child outcome measures was used to examine distal outcomes associated with parenting skill profiles.

Intervention Status. The intervention status was coded as 1 (*Intervention*) and 0 (*Control*). This study utilized an intent-to-treat analysis, in which families are retained in their randomly assigned intervention condition regardless of their attendance or participation in the intervention.

Covariates. Based on the Study 1 result, marital status was included as a covariate (1=*Married*, 0 = *Not married*). Additionally, baseline assessments of the outcome variables were used as control variables in the analysis.

Analysis

Analytical Plan. Extending the LPA analysis conducted in Study 1, Study 2 employed a *latent transition analysis* (LTA), an extension of LPA that uses longitudinal data to identify how subgroup status changes over time. LTA is an appropriate analysis to examine qualitatively distinct behavioral patterns across time points. Yet, past applications of LTA are limited (Martinent & Decret, 2015). Following LTA guidelines provided by Sorgente and colleagues' (2019), this study followed Nylund's (2007) 5-step procedure (detailed below).

In step 1, additional latent class measurement models for both parents were added for the T3 time point, as the longitudinal extension of LPA needs separate LPA models for each time point. The same class enumeration procedure described in Study 1 was followed to explore the number of heterogeneous subgroups at the 12-month follow-up (T3) by referring to the same model fit indices (e.g., AIC, BIC, aBIC,

adjusted LMR-LRT, entropy, and interpretability). This step gave a total of four separate LPA models: T1 mothers LPA, T3 mothers LPA, T1 fathers LPA, and T3 fathers LPA.

In step 2, a cross-sectional transition of profiles and measurement invariance was explored. After defining heterogeneity in both T1 and T3, the participants were fixed to their most likely latent group. Then the changes of latent groups over time were compared descriptively. This cross-tabulation of class membership across time provided a preliminary indication of class transition (Sorgente et al., 2019). In addition, using the chi-square difference test, the invariance of measurement parameters for each class at different time points in LTA were tested (Nylund, 2007).

In step 3, the specification of LTA was explored without covariates. Accounting for classification uncertainty using Vermunt's 3-step approach, the auto-regressive path was added in the unconditional model to predict the transition from the T1 latent profile variable to the T3 latent profile variable. This step gave latent status membership probabilities and transition probabilities. The transition probability is the probability of transitioning from a latent membership at time t to another latent membership at time t+1 (Collins & Lanza, 2010).

Then in step 4, the ADAPT intervention effect was added in the LTA model as an observed covariate. This examined whether the participation in an intervention predicted class membership at T3 (intervention effect). This step looked at the changes in the transition probabilities when involved in the ADAPT program versus the control condition and the results of the associated logistic regression.

Finally, in step 5, distal child outcomes (child externalizing and internalizing behaviors) were added to the LTA model. This step was used to examine how the transition of profiles, while incorporating classification uncertainties, predicted child adjustment at T4 (24-month follow-up). The mean differences in child adjustment variables of latent groups were tested by applying the Wald test (Nylund, 2007).

Missing data. The Little's MCAR test was conducted on all measures that were included in the analysis. The percentage of missing data in fathers' variables ranged from 2.4% to 26.4%, and in mothers' variables ranged from 2.3% to 25.4%. The amount of missingness increased at the T3 and the T4 assessment time point. The test showed that the pattern of missing values was not completely random among father study variables, χ^2 (174) = 230.551, p <.01, and mother study variables, χ^2 (180) = 217.462, p <.05. Father's missingness correlated with father's five parenting practices at T1 and T3; Mother's missingness correlated with mother's positive involvement, encouragement, and monitoring practices. Therefore, the data were likely to be missing at random (MAR). Full information maximum likelihood (FIML) was used to address missing data in the analysis. FIML estimation calculates parameter estimates using all available data and is preferred over other methods for dealing with missing data (Johnson & Young, 2011; Schafer & Graham, 2002).

Results

Descriptive statistics for both fathers and mothers are shown in Table 4. There was not a significant association between intervention status and other baseline

variables, supporting successful randomization. There was a significant positive correlation between intervention condition and both problem solving and positive involvement practice at the 1-year follow-up (T3) for mothers. These correlations suggest that the mother's problem-solving and positive involvement behaviors were higher at the one-year follow-up assessment point for those who received the intervention relative to those who did not.

First, separate LCAs at baseline and 1-year follow-up (T3) were examined for mothers and fathers, separately, to determine the optimal number of classes at each time point. As indicated in Study 1 results, the baseline LPA supported a three-class solution for both fathers and mothers (refer to Table 5). For fathers at T3, the fit indices suggested that the 3-class model was the optimal solution for the 1-year follow-up LCA. Father's 3-class model was the elbow of the decrease point in the AIC, BIC, and aBIC values; however, there was a group that consisted of only 1.44% of the sample (see Table 6). For mothers at T3, the fit indices also suggested that the 3-class model was the optimal solution for the 1-year follow-up LCA as the decrease in BIC slowed from a 3-class model while other indices were generally equivocal. However, similar to the father's LCA, there was a smaller class consisting of 4.72% of the sample (see Table 6). Also, the 3-class model was chosen in part to maintain consistency with the 3-class model at baseline, following the recommendation of Nylund et al. (2007). Similar to the T1 profiles, the profile with a relatively high score in positive parenting skills was labeled as the "High Parenting" group. The profile with relatively low scores in positive parenting skills including the high harsh discipline score was labeled as the "Low Parenting" group; the profile located in the middle of the high and low parenting group

was labeled as the “Middle Parenting” group. For both parents, the “Low Parenting” group consisted of a very small proportion of the sample at a 1-year follow-up data point.

Next, the measurement invariance was tested to see the equality of the parameters of the measurement model. As shown in Table 7, the full invariant model was significantly different from the baseline model (where all parameters are free) for both parents, meaning that the profiles at baseline could not be assumed to be identical to the 1-year follow-up profiles. However, to answer the research question, the latent profiles were set as invariant for further analysis. This approach allows for an examination of the movement between corresponding classes at each time point rather than examining the movement into different classes caused by the change in the class definitions at the follow-up assessment.

After setting the profiles to be invariant across time, cross-tabulations of class membership were used to preliminarily explore the type of movement in the sample. This approach uses a cross-sectional comparison of proportional class membership at each time point and does not examine the movement of specific cases across time. The cross-tabulation of membership suggested that proportions shifted in class membership for both mother and father participants at the 1-year follow-up time point. Notably, both mothers and fathers showed a decrease in the proportion of “Low Parenting” at Time 3. A relatively high proportion of the sample was included in the “High Parenting” group at both time points, suggesting some stability in membership among that group. See Table 8 for more details.

In Step 3, the LTA was conducted to examine the transition of classes by adding the first autoregressive path between the two time points. First, LTA models without covariates (i.e., unconditional models) were examined. See Table 9 for the transition probabilities. The transition probability values in the bottom-left diagonal (i.e., percentage of people who move toward more positive parenting) were higher than the values of the top-right diagonal (i.e., percentage of people who move toward low positive parenting) for both mothers and fathers. Both parents showed high stability over time when they belonged in the "High Parenting" group at baseline (fathers = 88.4%; mothers = 86.9%). About 62% of fathers in the "Low Parenting" group shifted to the "Middle Parenting" group, while about 58% of mothers in the "Low Parenting" group shifted to the "Middle Parenting" group.

Next, the intervention effect was included in the models (i.e., conditional models). The inclusion of intervention status allowed for a comparison of the rates of transition across the groups. Latent transitional probabilities in the intervention and control groups as well as the difference between the two are shown in Table 10 for fathers and Table 11 for mothers. Overall, the differences between the intervention and control transition probabilities were larger for mothers than they were for fathers. The size of transitional probability differences ranged from 0% to 21.8% for fathers, and 0% to 48.2% for mothers. The "Middle Parenting" fathers in the control group at baseline were significantly more likely to move to the "Low Parenting" group than fathers in the treatment group (difference in transition = 21.8%, p = .017). For mothers, relative to the control group, those who were in the treatment group were more likely to move from the "Middle Parenting" to the "High Parenting" group (difference in transition = 48.2%,

p = .000) and, similar to fathers, those who were in the control group were more likely to move from “Middle Parenting” to “Low Parenting” group than those in the intervention group (difference in transition = 37.1%, *p* = .036). Also, there was a trend for mothers in the intervention group to be more likely to move from “Low Parenting” to “High Parenting” relative to the control group (difference in transition = 21.2%, *p* = .058).

Finally, the distal outcome of child adjustment behaviors was included. The difference of child externalizing and internalizing outcomes by the type of profile transition was evaluated using the Wald test. All possible transition pathways were compared for differences in these outcomes. For externalizing, fathers who stayed in the “High Parenting” group for both time points had significantly lower child externalizing behavior than those who moved from “High Parenting” to the “Low Parenting” group (Wald test (1) = 24.64, *p* = .000). Father’s stable “Middle Parenting” group also demonstrated some differences with other groups, but they will not be reported in this study due to the very small proportion of the sample in that transition group. For mothers, those who moved from the “Low Parenting” to the “High Parenting” group showed significantly lower child externalizing problems than those who moved from the “Low Parenting” to the “Middle Parenting” group (Wald test (1) = 11.358, *p* = .045). Other transition groups did not show significant differences in child externalizing.

For internalizing, fathers who moved either to “High Parenting” or “Middle Parenting” from the “Low Parenting” group showed significantly lower child

internalizing problems than those who stayed in the "Low Parenting" group (Wald test $_{\text{Low-High}}$ (1) = 15.942, p = .000; Wald test $_{\text{Low-Mid}}$ (1) = 13.775, p = .000). Again, the study will not report the findings involving the mother's stable "Middle Parenting" group due to the small proportion of the sample in that transition group.

Discussion

Past literature investigating the ADAPT intervention has shown a significant effect on parenting at a 1-year follow-up (Gewirtz et al., 2018b). The current study extended previous evaluations of the ADAPT program to identify heterogeneity in the changes of parenting by using LTA to look at mothers and fathers separately. Using four-wave data from a randomized controlled trial of the ADAPT parenting intervention, the LTA revealed several important findings. Both mothers and fathers of a military family who participated in the ADAPT program were more likely to show improvement in their parenting practices than those who received services-as-usual. Specifically, a preventive effect was found for both fathers and mothers who received the parent training program who began with levels of positive parenting practices generally typical for the sample (i.e., "Middle Parenting"). Without ADAPT, a significant number of these families began to demonstrate more dysfunctional and less adaptive parenting after one year (i.e., "Middle Parenting" to "Low Parenting"). ADAPT seemed to help prevent this decline and reduced the number of families whose parenting became less adaptive over time. Mothers who began the intervention with typical levels of adaptive parenting who received ADAPT also showed improvement in

parenting practices by moving to a higher level of parenting practices. Furthermore, changes in parent's profiles showed a meaningful association with distal child externalizing and internalizing problems, lending additional validity to the profile transitions.

First, consistent with the prior research by Gewirtz et al. (2018b; 2016), the LTA results supported that the treatment increased the likelihood of parents transitioning toward positive parenting. Only mothers showed a significant difference in transition probabilities across intervention and control groups in movement from the "Middle Parenting" to "High Parenting"; there was a marginal effect on the movement from the "Low Parenting" to "High Parenting" group for mothers as well. This is consistent with a previous study where mothers and not fathers showed a significant intervention effect on emotion regulation (Gewirtz et al., 2016). Also, relative to fathers, mothers who exhibited typical parenting at baseline were more likely to stay in the "Middle Parenting" group if they were in the control group. It is likely that without intervention, mothers tend to maintain similar parenting skills. Those mothers who receive a parent training program are better able to make improvements in their parenting skills.

The current results did not fully support the hypothesis that individuals with greater room for improvement will benefit more. Mothers with moderate levels of positive parenting tended to benefit more than those who had lower parenting skills marked by higher use of inept discipline strategies. This is inconsistent with some existing literature examining risk as a moderator of response. For example, when examining child characteristics, a substantial amount of literature supports that

parenting interventions tend to benefit higher risk children the most (i.e., higher levels of disruptive behavior, conduct problems, lower executive functioning) (Leijten et al, 2018; Shelleby et al., 2018; Bierman et al., 2008). van Aar and colleagues (2019) similarly found that parents exhibiting harsh and inconsistent parenting derived more intervention benefits from a parenting program relative to those parents who exhibited more adaptive parenting strategies. The findings from this study may differ from van Aar et al. (2019) in part because van Aar and colleagues combined pre-intervention parenting together with a child's baseline problem behavior in creating a latent profile. There is limited research in the parent programming literature that looks at parenting as a moderator for an intervention response; future research may further investigate the pre-intervention parent-level predictors to understand the variability in the parenting intervention responses. In general, the differences observed in the current findings may relate in part to linearity assumptions made within most previous moderator research. Our findings point towards a non-linear relationship between baseline risk and intervention response, with those in middle-risk levels tending to exhibit a greater response that may not be clearly captured in a standard linear model.

Interestingly, the parenting intervention supported a preventive effect for both parents in reducing the likelihood of developing coercive parenting. The parents who were in the control group were more likely to move towards the "Low Parenting" group involving higher inept discipline than those in the intervention group. This finding provides unique evidence that the parenting program is effective in its preventive role for fathers who had not shown a reliable intervention effect in previous studies. This stresses the importance of identifying heterogeneity within parents and the value of a

person-centered approach to understanding change in parents. This could also support why intervention effects on fathers have been harder to detect. For example, the preventive effect could occur within a specific subgroup that may have been harder to catch with a variable-centered approach. Fathers may also need a longer time to show actual improvement in their parenting relative to mothers. Moreover, this may be a typical pattern of parenting change for a subset of post-deployed military families. Without a parenting program, family processes may degrade for some families due to ongoing stressors such as mental health concerns. This finding reveals the need to look at the stability of an outcome variable as potentially positive; previous literature has often focused just on creating significant changes in pre-post outcomes.

Supporting the importance of parenting transitions, negative transitions were associated with higher child externalizing and internalizing behavior. This association aligns with the findings of several meta-analyses demonstrating an association between parenting strategies and child adjustment (Pinquart, 2017; Weymouth et al., 2016; Rueger et al., 2016). For child externalizing behavior, fathers who moved from high to low positive parenting skills had a higher average of child externalizing problems at a two-year follow-up relative to those who did not make this transition. This association is consistent with a meta-analytic review that poor paternal parenting was more strongly associated with child delinquency than poor maternal parenting (Hoeve et al., 2009). Mothers who showed the highest improvement in their parenting practices showed lower child externalizing behavior relative to those mothers who tended not to make improvements. Mothers who participated in the parenting program were more likely to improve their parenting and, in turn, reduce child externalizing behavior. The more

notable improvements in mothers' parenting relative to fathers may have a particularly salient impact on the family. Improvements in maternal parenting could be more influential for children as mothers are more often the primary caregiver (Rothbaum & Weisz, 1994; Lewis & Lamb, 2003), and perhaps even more so for military families in which civilian parents are more commonly mothers.

For child internalizing behavior, only fathers' positive movement in parenting tended to be associated with reductions in child internalizing relative to those who maintained lower levels of positive parenting. Mothers' transitions in parenting did not show any relationship with child internalizing behavior. This may indicate that a post-deployment paternal reduction in psychological control (i.e., manipulating child's thoughts and feelings, conditional loving) and an increase in positive encouragement may be most effective in improving child internalizing behavior, as internalizing has shown a stronger relationship with parents' psychological control than behavioral control (Gorostiaga et al., 2019). Yet, some empirical studies have shown similar maternal parenting effects on internalizing symptoms (Smokowski et al., 2015; Rueger et al., 2016; Vazsonyi et al., 2021). To understand the variability of parental effects on a child's internalizing symptoms, future studies should look at the moderating effect of parent gender between their parenting and child internalizing behavior.

Limitations

Several limitations of the current study should be noted. First, a statistical limitation should be noted in the LTA model that included the children's distal outcomes. The final model statistically compared the mean of child externalizing and internalizing

behavior at a 2-year follow-up (T4) by parent's transition in their parenting profiles. However, because there were some transitions with a low proportion of parents (i.e., the Middle to Middle parenting group had less than 1% sample proportion), the results involving these transitions are unreliable. This could be because the overall sample size to represent each unique parenting class was relatively small; LTA requires intensive computation as a mixture model and performs best with large sample sizes (Lanza et al., 2013). Therefore, researchers should be cautious in interpreting the comparisons of the distal outcome, and more studies should be conducted to replicate the relationship between changes in parenting and child distal outcomes. However, the findings are suggestive of a potential relationship between changes in parenting and child maladjustment.

Second, to facilitate the interpretation of class transitions, the LTA used a full invariance model across timepoints regardless of the variance in item-response probabilities. This LTA did not compare how the profiles were different across time but rather how the parents moved from one class to another. Again, future studies with a larger sample size can explore the extent of the variance across the two latent profiles at each time point. Yet, this study gives an important foundation to understand the actual movement of parents in the context of parenting.

Third, there is a potential for rater bias as the study relied only on an observational measure of parenting. Even though there is a lower risk of self-report bias in observational coding relative to self-report rating scales, the use of global coding still cannot eliminate the coder's bias in their perception of the family interaction. For example, the coders could have given an overall high score for a particular family if

they perceived a positive interaction in general. This could have caused the division of parenting profiles into three levels with overall relatively consistent skills rather than showing mixed parenting profiles. However, observations are more reliable estimates of change and robust measurements of parenting that could prevent expectancy bias (Snyder et al., 2006; Patterson, 1982). In future studies, parenting practices collected through multiple measures (i.e., self-reported parenting, physiological regulation) can be examined together with the observational data to identify the subgroups within the families.

Finally, a few limitations are important to note about the sample. As this study focused on those who were recently deployed, these findings cannot be generalized to other parents who participate in parent training programs. Also, a lack of diversity in the sample should be noted; the majority of participants were white middle-income families from a Midwestern state. Therefore, future studies examining the replicability of the findings with more diverse families will be important.

Conclusion.

Parenting interventions have shown to be effective in promoting child adjustment, but our understanding of who benefits more or less from these interventions is limited, particularly for high-risk families such as post-deployed military families. Previous studies are notably limited due to using a variable-centered approach that assumes a linear effect of an intervention (van Aar et al., 2019). Therefore, the key implication of this study lies in the use of a person-centered approach to identify the qualitative change in parenting skills of mothers and fathers when they participate in

parent training programs. The study demonstrated that those parents who showed typical levels of positive parenting will benefit most through the ability of ADAPT to prevent regressions in parenting and the development of coercive parenting. Furthermore, mothers were also more likely than fathers to show significant improvements in their parenting practices. A strength of this study is the identification of these differing response trajectories using latent transition analysis.

In sum, the current study informs our understanding of how parent training programs change parents' parenting practices. Ultimately, these findings will be a foundation to help strengthen parenting programs by identifying those high-risk families most likely to benefit and eventually provide components or dosage tailored to families' unique needs. In turn, this will help to effectively promote children's positive adjustment through providing services most likely to improve parenting over time.

General Conclusion

Both Study 1 and Study 2 examined heterogeneity in both parenting practices and in the effects of a preventive parenting intervention for military families. Study 1 demonstrated the heterogeneity in parenting for both mothers and fathers separately. Latent profile analysis was conducted with five core parenting domains from an observed family interaction task. The analyses demonstrated that mothers and fathers both have three unobserved parenting profiles, which were consistent with high, middle, and low positive parenting. Study 1 also showed that married mothers are more likely to be in a high positive parenting group than single mothers.

Study 2 extended Study 1 by using a latent transition analysis to look at how the ADAPT parenting intervention affected the movement of parenting profiles across time and the relationship of parenting profile transitions with child maladjustment. Mothers were more likely than fathers to move to groups associated with stronger parenting skills due to the parenting program. However, the ADAPT program showed preventive effects for both mothers and fathers with typical levels of positive parenting by reducing the likelihood they would degrade in their positive parenting. Also, those parents who moved toward higher positive parenting profiles were more likely to report lower child maladjustment. In Study 2, the findings suggest that the ADAPT parenting intervention is beneficial in improving the parenting skills of mothers who begin the program with more typical levels of parenting skills, and that these positive changes in parenting may help to decrease child externalizing problems. ADAPT seemed to be most helpful in preventing declines in positive parenting for fathers. It may be that fathers will benefit

from additional support or practice and time to ensure they also make significant improvements in their parenting practices through parent programming.

One of the key contributions of this research overall is demonstrating the sample heterogeneity in parenting behavior and the variability in their responses in the evidence-based parenting program. The extant literature has tended to assume homogeneity of parenting skills within samples and is limited in looking at how parenting practices of parents at baseline can impact the effect of the parenting program. Moreover, both studies yield additional insight into differences between mothers and fathers. The majority of existing research into parenting as well as parent-focused programming has focused on mothers with very limited work that looks at both parents separately. The current findings provide further support for the value of exploring unique parenting-related findings for mothers and fathers separately. Another strength of this study was the use of observed parenting data. This approach controls for certain self-report biases that may be prevalent in rating scales and allows for a more rigorous examination of the intervention effect.

However, limitations of both studies were noted. There is a potential for underpowered analysis due to insufficient subgroup size in some profiles and transitions. Another limitation was noted in the relative consistency in the parenting skills observed within each of the parenting profiles. Parents were generally categorized in profiles in relation to their overall levels of parenting skills rather than in profiles with mixed skills across different aspects of parenting. Coders may form overall impressions of families that influence their ratings towards relative consistency across

parenting skills. Given the lack of heterogeneity in skills within profiles, it is possible that similar results could have been produced using a continuous moderator. Finally, there was a lack of diversity in the study sample which may have also contributed to relative heterogeneous profiles. A more demographically diverse sample and the inclusion of multi-method indicators could further reveal variability in parenting profiles.

In conclusion, the ADAPT program seems to be successful for certain subgroups in improving parenting and preventing regressions in parenting, and in turn improving child adjustment. As researchers continue to learn more about who benefits most from what content in parenting programs, this approach will help developers to create adaptive programming targeted to the needs of a particular family and enhance the effects of the program for parents and families in need.

Table 1.

Descriptive statistics of Fathers' and Mothers' Study 1 Study Variables

	Father		Mother								
Study variables	*M*	*SD*	*M*	*SD*	1	2	3	4	5	6	7
1. Marital Status	0.89	0.31	0.89	0.32	1	-.03	.18**	.21***	.02	.09	-.24***
2. PTSD	29.8	12.23	26.8	8.87	-.16**	1	-.02	-.11	-.07	-.19**	.14*
3. PSO	2.50	0.62	2.56	0.67	.11	.00	1	.54***	.20**	.09	-.32***
4. PINV	3.39	0.53	3.49	0.46	.00	-.05	.47***	1	.46***	.24***	-.44***
5. ENC	2.70	0.77	2.66	0.70	-.09	-.04	.23***	.62***	1	.31***	-.20***
6. MON	3.15	0.94	3.69	0.78	-.08	.00	.10	.39***	.38***	1	-.25***
7. DIS	1.30	0.35	1.37	0.43	.12	-.014	-.26***	-.29***	-.15*	-.11	1

Note. PSO = Problem Solving; PINV = Positive Involvement; ENC = Encouragement; MON = Monitoring; DIS = inept discipline. Positive correlation shows fathers' and inverse correlation shows mothers' inter-correlations between study variables. Marital status was coded 1 (*married*) and 0 (*single*).

* p<.05, ** p<.01, ***p<.001

Table 2.

Absolute and Relative Fit Indices for Measurement Models at T1

Group	*Classes*	*LL*	*AIC*	*BIC*	*aBIC*	*Entropy*	*LMR-LRT (p)*	
Fathers	2	-1157.07	2346.138	2404.006	2353.273	0.690	177.596	0.005
	3	-1115.39	2274.785	2354.354	2284.596	0.758	80.951	0.047
	4	-1093.77	2243.533	2344.802	2256.020	0.819	42.006	0.375
	5	-1074.48	2216.957	2339.928	2232.120	0.853	37.463	0.038
Mothers	2	-1212.11	2456.222	2515.268	2464.527	0.894	192.839	0.0944
	3	-1161.25	2366.493	2447.681	2377.912	0.744	98.834	0.1153
	4	-1132.41	2320.81	2424.14	2335.343	0.784	56.042	0.324
	5	-1114.45	2296.892	2422.364	2314.539	0.809	34.896	0.3901

Note. LL = log likelihood; AIC = Akaike information criterion; BIC = Bayesian information criterion; aBIC = adjusted BIC; LMR-LRT = Lo-Mendell-Rubin likelihood ratio test.

Table 3.

Class counts and proportions for each latent class variable

# of Classes	*Fathers*		*Mothers*	
	N	%	*N*	%
1	161	0.59	44	0.16
2	114	0.41	252	0.85
1	113	0.41	166	0.56
2	133	0.48	30	0.1
3	29	0.10	100	0.34
1	126	0.46	7	0.02
2	15	0.05	47	0.16
3	21	0.08	82	0.28
4	113	0.41	160	0.54
1	12	0.04	20	0.07
2	124	0.45	157	0.53
3	115	0.42	10	0.03
4	2	0.01	77	0.26
5	22	0.08	32	0.11

Table 4.

Descriptive statistics of Fathers' and Mothers' Study 2 Study Variables

Study variables		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Treat		1	.03	.02	-.03	-.10	.09	-.04	.15*	.20**	.06	.01	.00	-.01	-.11	-.04	-.05
2. Mar. Status		-.10	1	.18**	.20**	.02	.09	-.24**	.14*	.09	-.04	.00	-.22**	-.11	-.13*	-.04	-.05
3. PSO_T1		-.01	.11	1	.53**	.20**	.09	-.32**	.33**	.27**	.01	-.01	-.26**	-.25**	-.13	-.01	.01
4. PINV_T1		-.04	.00	.47**	1	.46**	.24**	-.44**	.20**	.34**	.14*	.04	-.29**	-.12*	-.05	.03	.06
5. ENC_T1		-.05	-.09	.23**	.62**	1	.31**	-.20**	.12	.32**	.36**	.20**	-.11	.13*	.12	-.01	.09
6. MON_T1		.02	-.08	.10	.39**	.37**	1	-.26**	.04	.05	.09	.11	.08	.01	.01	-.07	.00
7. DIS__T1		-.01	.12	-.26**	-.29**	-.15*	-.11	1	-.16*	-.22**	.00	.00	.33**	.15*	.01	-.05	.01
8. PSO_T3		.12	.06	.26**	.25**	.16*	.16*	-.06	1	.54**	.13	.11	-.31**	-.06	-.12	.04	-.01
9. PINV_T3		.09	.00	.24**	.42**	.34**	.29**	-.08	.54**	1	.50**	.21**	-.30**	.00	-.04	.05	.02
10. ENC_T3		-.05	-.04	.03	.31**	.47**	.26**	.01	.28**	.52**	1	.21**	.07	.15*	.11	-.08	.02
11. MON_T3		.07	.04	.05	.21**	.18*	.29**	-.11	.11	.30**	.25**	1	.00	.08	.04	-.05	-.06
12. DIS__T3		.01	-.07	-.16*	-.25**	-.18*	-.07	.29**	-.26**	-.51**	-.23**	-.30**	1	.10	.23**	-.01	.08
13. Ext_T1		-.04	-.14*	-.17**	.01	.09	.04	.15*	-.06	.08	.16*	.04	.00	1	.48**	.11	.16**
14. Ext_T4		-.10	-.06	-.16*	-.17*	.00	-.11	.14	-.12	-.14	.00	-.09	.21**	.51**	1	.25**	.47**
15. Int_T1		-.08	.00	-.06	.03	.00	.03	-.09	-.02	.04	-.07	-.03	.02	.12	.20**	1	.65**
16. Int_T4		-.09	-.05	-.03	.06	.04	-.01	.03	-.06	-.04	-.07	-.04	.06	.22**	.45**	.62**	1
Father	Mean	0.62	0.89	2.50	3.39	2.70	3.15	1.30	2.81	3.54	2.64	3.20	1.23	57.90	50.88	51.62	51.16
	SD	0.49	0.31	0.62	0.53	0.77	0.94	0.35	0.66	0.53	0.64	0.84	0.38	14.31	8.37	9.63	9.27
Mother	Mean	0.60	0.89	2.56	3.49	2.66	3.69	1.37	2.97	3.67	2.62	3.62	1.25	57.96	51.15	51.71	51.19
	SD	0.49	0.32	0.67	0.46	0.70	0.78	0.43	0.69	0.48	0.67	0.74	0.37	14.15	8.53	9.84	9.79

Note. PSO = Problem Solving; PINV = Positive Involvement; ENC = Encouragement; MON = Monitoring; DIS = inept discipline. Positive correlation shows fathers' and inverse correlation shows mothers' inter-correlations between study variables. Marital status was coded 1 (*married*) and 0 (*single*) and treatment status was coded 1 (*treatment*).

* p<.05, ** p<.01, ***p<.001

Table 5.

Absolute and Relative Fit Indices for Measurement Models at T1 and T3

Group	*Time*	*Classes*	*LL*	*AIC*	*BIC*	*aBIC*	*Entropy*	*LMR-LRT (p)*	
Fathers	T1	2	-1157.07	2346.138	2404.006	2353.273	0.69	177.596	0.0052
		3	-1115.39	2274.785	2354.354	2284.596	0.758	80.951	0.047
		4	-1093.77	2243.533	2344.802	2256.02	0.819	42.006	0.3748
		5	-1074.48	2216.957	2339.928	2232.12	0.853	37.463	0.0375
	T3	2	-829.666	1691.331	1744.732	1694.036	0.977	183.977	0.3324
		3	-768.142	1580.284	1653.71	1584.003	0.953	119.321	0.0971
		4	-738.342	1532.683	1626.134	1537.417	0.822	57.796	0.1089
		5	-711.163	1490.326	1603.802	1496.074	0.864	52.711	0.1637
Mothers	T1	2	-1212.11	2456.222	2515.268	2464.527	0.894	192.839	0.0944
		3	-1161.25	2366.493	2447.681	2377.912	0.744	98.834	0.1153
		4	-1132.41	2320.81	2424.14	2335.343	0.784	56.042	0.324
		5	-1114.45	2296.892	2422.364	2314.539	0.809	34.896	0.3901
	T3	2	-918.916	1869.832	1925.048	1874.336	0.972	138.009	0.2913
		3	-869.005	1782.01	1857.933	1788.204	0.777	96.86	0.1539
		4	-836.841	1729.681	1826.311	1737.564	0.815	62.42	0.1706
		5	-821.226	1710.452	1827.787	1720.024	0.827	30.303	0.6764

Note. LL = log likelihood; AIC = Akaike information criterion; BIC = Bayesian information criterion; aBIC = adjusted BIC; LMR-LRT = Lo-Mendell-Rubin likelihood ratio test.

Table 6.

Class counts and proportions for each latent class variable at T3

# of Classes	*Fathers*		*Mothers*	
	N	%	*N*	%
1	13	0.06	219	0.94
2	195	0.94	14	0.06
1	3	0.01	135	0.58
2	26	0.13	87	0.37
3	179	0.86	11	0.05
1	136	0.65	19	0.08
2	25	0.12	124	0.53
3	44	0.21	86	0.37
4	3	0.01	4	0.02
1	30	0.14	11	0.05
2	4	0.02	109	0.47
3	133	0.64	27	0.12
4	2	0.01	82	0.35
5	39	0.19	4	0.02

Table 7.

Fathers and Mothers Measurement Invariance Test

		LL	SCF	*d*	diff	*df*	*p*-value
Fathers	Baseline	-1883.53	1.363	44			
	Full invariance	-1942.78	2.1439	29	59.243	15	0.000
Mothers	Baseline	-2030.25	1.5853	44			
	Full invariance	-2059.15	1.6461	29	28.899	15	0.017

Note. LL = log likelihood; SCF = scaling correction factor of the robust maximum likelihood estimator; *d* = number of free parameters; diff = difference test value; *df* = degree of freedom of the difference test.

Table 8.

Change Over Time Using Cross-sectional Results

			T3			
			High (%)	Mid (%)	Low (%)	Total (%)
a) Fathers	T1	High	104 (87)	14 (12)	1 (1)	119 (100)
		Mid	101 (69)	36 (25)	9 (6)	146 (100)
		Low	12 (52)	9 (39)	2 (9)	23 (100)
	Total		217	59	12	288
			T3			
			High (%)	Mid (%)	Low (%)	Total (%)
b) Mothers	T1	High	66 (81)	15 (19)	0 (0)	81 (100)
		Mid	112 (58)	71 (37)	9 (5)	192 (100)
		Low	21 (62)	11 (32)	2 (6)	34 (100)
	Total		199	97	11	307

Note. Column percentages are reported; a) fathers cross-sectional result; b) mothers cross sectional result

Table 9.

Transition Probabilities for both fathers and mothers

		T3		
	T1	High	Mid	Low
Fathers	High	**0.884**	0.116	0.000
	Mid	0.496	**0.409**	0.095
	Low	0.293	0.619	**0.088**
		T3		
	T1	High	Mid	Low
Mothers	High	**0.869**	0.131	0.000
	Mid	0.422	**0.515**	0.063
	Low	0.314	0.576	**0.110**

Note. Stable transitions are bolded.

Table 10.

Changes in the Transition Probabilities on the Intervention Status for Fathers

		T3		
TREAT=0		High	Mid	Low
	High	0.655	0.344	0
T1	Mid	0.154	0.385	0.462
	Low	0.245	0.755	0
TREAT=1		High	Mid	Low
	High	0.847	0.153	0
T1	Mid	0.3	0.456	0.244
	Low	0.098	0.705	0.197
		High	Mid	Low
	High	-0.192	0.191	0
Difference	Mid	-0.146	-0.071	0.218*
	Low	0.147	0.05	-0.197

Note. * p <.05

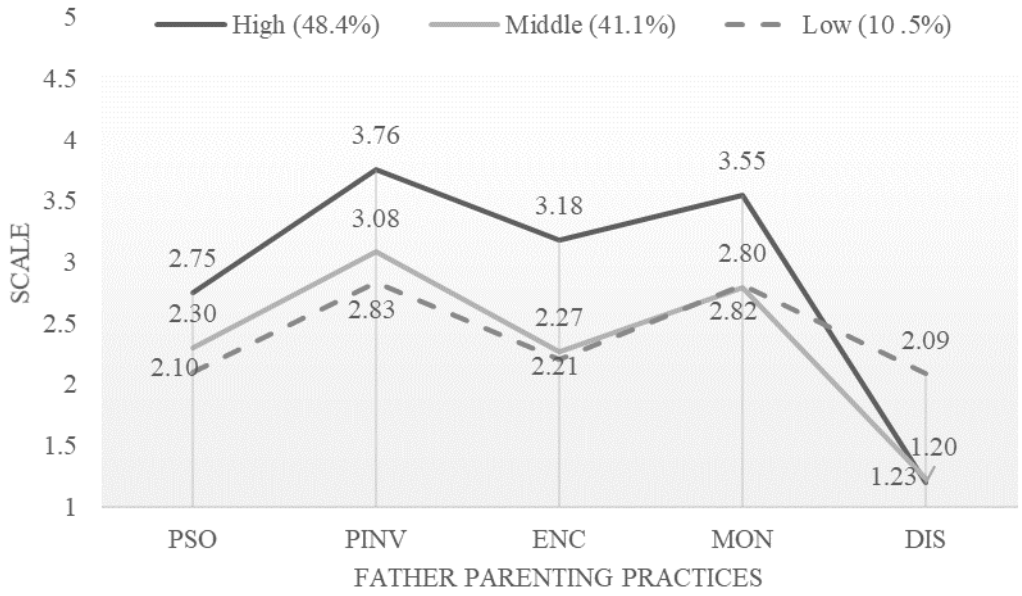
Table 11.

Changes in the Transition Probabilities on the Intervention Status for Fathers

		T3		
TREAT=0		High	Mid	Low
	High	0.762	0.238	0
T1	Mid	0.132	0.495	0.373
	Low	0.253	0.747	0
TREAT=1		High	Mid	Low
	High	0.952	0.048	0
T1	Mid	0.614	0.384	0.002
	Low	0.465	0.517	0.018
		High	Mid	Low
	High	-0.19	0.19	0
Difference	Mid	-0.482^{***}	0.111^{**}	0.371^{*}
	Low	-0.212^{+}	0.23	-0.018

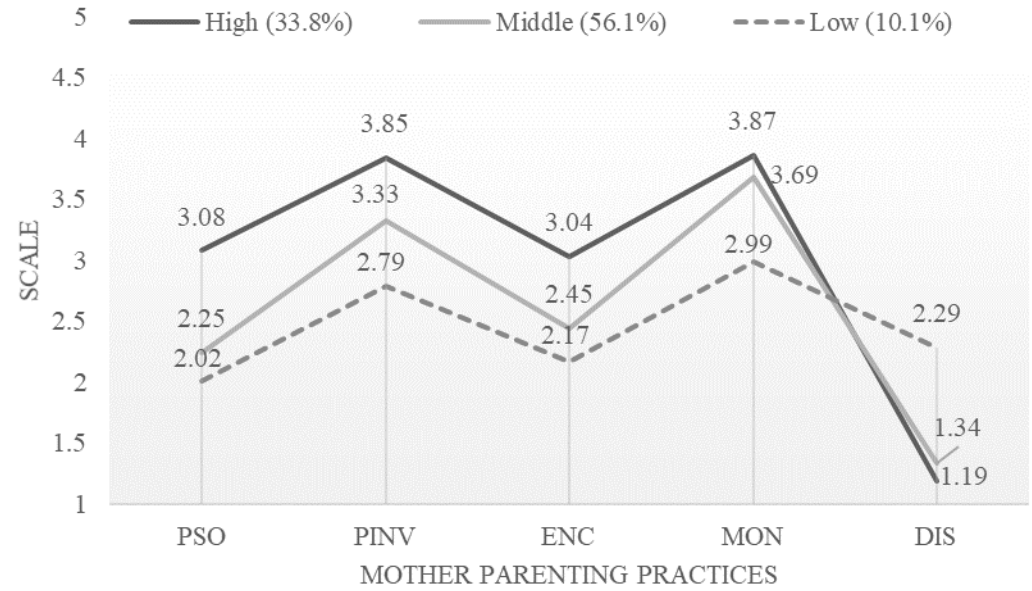
Note. ^{+}p <.10, $^{*}p$ <.05, $^{**}p$ <.01, $^{***}p$ <.001

Figure 1. Fathers' Parenting Profile at Time 1 (N= 275)



Note. PSO = Problem Solving; PINV = Positive Involvement; ENC = Encouragement; MON = Monitoring; DIS = inept discipline.

Figure 2. Mothers' Parenting Profile at Time 1 (N= 296)



Note. PSO = Problem Solving; PINV = Positive Involvement; ENC = Encouragement; MON = Monitoring; DIS = inept discipline.

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